

What is claimed is:

1. An apparatus for forming thin films, comprising:  
a chamber for sequential formation of at least a first thin film and a second thin  
5 film on a substrate by an antenna type plasma CVD method; and  
a residual material removal apparatus which removes from the chamber residual  
materials which have an effect on the properties of the second thin film, the residual  
materials resulting from a step of forming the first thin film of the plurality of thin films.
- 10 2. A method for forming thin films, comprising the steps of:  
forming a plurality of thin films by the sequential formation of at least a first  
thin film and a second thin film on a substrate in one chamber by an antenna type plasma  
CVD method,  
removing residual materials after a step for forming the first thin film, and  
15 forming the second thin film after the step for removing residual materials.
3. A method for forming thin films according to claim 2, wherein  
the second thin film is a semiconductor film, and  
the residual materials are materials which inhibit the semiconductor properties  
20 of the second thin film.
4. A method for forming thin films according to claim 2, wherein the step of  
removing the residual materials inside a chamber is performed, and the step of removing  
the residual materials includes plasma cleaning which generates plasma in the vicinity of  
25 an array antenna.

5. A method for forming thin films according to claim 4, wherein the plasma cleaning is performed by hydrogen plasma.

5 6. A method for forming thin films according to claim 2, wherein the step of removing the residual materials inside a chamber includes a step of gas replacement.

7. A method for forming thin films according to claim 2, wherein the step of removing the residual materials inside a chamber includes a step of evacuation of the  
10 chamber.

8. A method for manufacturing a solar cell comprising the step of forming semiconductor thin films on a substrate by the method of forming thin films according to claim 2.

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9. A solar cell manufactured by the method for manufacturing a solar cell according to claim 8.